Usewear and residus analysis : The comparison of flint and limnosilicite flakes used for vegetable processing

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INTRODUCTION

The aim of our work was to test the possibilities of vegetable processing with the most simple flake tools. We intended to answer one major scientific question; I**s there any observable difference on our tools based on the utilized raw material**? This question has two aspect; **1) the usability of the tool an 2) the micro use-wear on the working edge**; i. e. can the same activity create any kind of different traces or not? To answer our question, we did the experiment with 4 limnosilicite and 4 flint flake. During the experiment we learned about the usability of these tools and we did observations on the working edges after the experiment.

To date there has been no published work about this type of activity. This experiment is an opportunity to determine what are the damages, traces or residues resulting from the use of stone tools to work vegetables.

MATERIAL AND METHODS

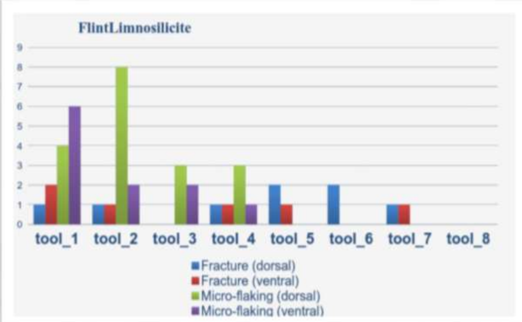
We decide to do two activity; **peeling and cutting**. In each case one tool was just used for one type of activity, but almost in every case we used our tools on two vegetables (**celery and white carrot**). The only exception was tool number 5 which was broken before the end of the activity. The experiments were done for 20 minutes with a break around 10 minute. After the break we switched the worked material, but we did not changed the activity.
The flint was originated from **Volhínia (Western Ukraine)** and the limnosilicite originated from **Rátka (Northern Hungary)**.
The morphometrics data consisted in angle, maximum length, maximum width, maximum thickness, length of the working edge of each tool. The additional measurements were concerning the technical orientation and projected line for the width.
Before and after the experiment we used a **Dino-Lite Pro HR digital microscope** to document the working edge of our tools. Pictures were taken before the experiment, then just after to observe residues, and after cleaning. For the cleaning, an **ultrasonic cleaner** VWR®, 220V **has been used**.

RESULTS

Unlikely our expectations, the tools were functioning perfectly during the activities and it was also possible to observe use-wear traces, both in macro and micro level.

First of all, we experienced different utility of the flakes according to the different activities. It became obvious that **our tools are way more useful for peeling vegetables** than cutting them. In fact when we tried to cut the celery with the tools it was necessarry to do it with a kind of circiling motion in order to be effective. But during the usage of tool number 5, it happened to be broken shortly before the end of the first 10 minute sequence. After this incident, it was unusable because of the extensive fracture on the working edge.

If we look at our experiment from the aspect of the raw materials, we should say that this is not an issue which had an effect on the usability. Considering the tool number 5., it is also worth to notice that **most likely the morphological characters led to the breakage** than the fact that this flake was limnosilicite. This statement can be supported by our microscopic observations as well.



Tool: EXP01; face: dorsal; pictures; 15 (before); 19 (after)

Microflaking and concave fracture on the dorsal face of the tool number 1

TOOL : EXP07, Face: Ventral; Pictures: 13 (before use), 15 (after use)

ACTION : CUTTING

Deeply abrupt fracture on the ventral face of the tool number 7

In the case of **the limnosilicite tools we can not observe any microflaking**.

Another variable was the activity. Based on the circiling motion we could expect more intensive traces in the dorsal faces, although in our experimental tools we were not able to observe any differences in the dorsal face between those pieces which were used for peeling or used for cutting. **One of the particular difference which can be observed is the shape of the breakage**. Normally we can observe staight and **concave fractures** (tool 1), however there is a deeply abrupt fracture, which can be found in a limnosilicite cutting tool. Probably the reason behind this fracture the **multi-directional force** which was effecting the protruding part of the working edge.

We can certainly claim that the exact same activity can cause different traces on the edge of our tools if we have different raw materials, which well testifyed by the **microflakings**.
Namely these features **appeared only on the working edges of the flint tools (ex : tool 4)**

Microflaking on the ventral face of the tool 4. This working edge was documented with the use of another microscope ZEISS SteREO Discovery.V8 zoom-stereomicroscope

DISCUSSION AND CONCLUSION

Due to the limitation of our equipment, the observations were uncertain in several cases. However the description of the fractures can be considered really accurate. Some of these damages were visible even macro level and some difference appeared based on tool morphology and action, but not based on the raw material. The better classification of the fractures would require a more extensive experiment, although the edge fractures are almost always unpredictable and they are not related to specific material and use (Manuel et al 2015, 13) In the case of the microflakes, we can see the limitation of the applied technology. It seems for us certain that there were microflakes related to the activity in the flint tools, meanwhile there where no microflakes on the limnosilicite. We should classify the scars of our microflakes as scalar-shaped scars, based on the classification of Tringham et al. 1974. **So we can conclude that there is an observable difference on the working edge of our tools, based on that they were made out of which raw material. However the significant edge damage appeared in almost every case and it was more affected by the tool morphology and the activity.**

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